IN THE CLAIMS

The claims in the application as originally filed, United States Serial No. 09/672,065, contained the following twelve claims:

1. A process for the extraction and purification of zeolite from a zeolite ore containing other mineral phases comprising the steps of:

preparing a slurry consisting of demineralized water and zeolite ore having a mean particle size ranging from about 10 to 40 microns, said slurry having a density of about 5% to 40%, said slurry having a demineralized water to zeolite ore mass ratio sufficient to substantially suspend ;

subjecting said slurry to mechanical dispersion having a demineralized water to zeolite ore mass ratio to substantially suspend any clay fraction of said zeolite ore;

allowing said zeolite to settle from said slurry resulting in an upper aqueous fraction and a settled zeolite fraction;

separating said settled zeolite fraction and said upper aqueous fraction; and

mixing said settled zeolite fraction with demineralized water to produce a slurried process stream.

2. The process of claim 1 further comprising the steps of:

injecting said slurried process stream into a multistage countercurrent primary separation column at about the midpoint of said primary separation column, said primary separation column having upper, lower and mid-stages;

injecting demineralized water into said lower stage of said primary separation column;

extracting an overflow stream of suspended zeolite from said upper stage of said primary separation column; and

controlling the injection rate of said slurried process stream and said demineralized water into said primary separation column and the extraction rate of said suspended zeolite such that said demineralized water flows upward at a rate sufficient to suspend said zeolite and such that higher density components of said slurried process stream, having a net settling velocity, flow downward to said lower stage of said primary separation column.

3. The process of claim 1 further comprising the steps of:

injecting said suspended zeolite from said primary separation column into a secondary separation column, said secondary separation column having upper and lower portions;

injecting demineralized water into said secondary separation column near said lower portion;

extracting a fine particle overflow stream from said upper

portion;

controlling the injection rates of said suspended zeolite and said demineralized water into said secondary separation column and the extraction rate of said fine particle overflow stream such that a countercurrent flow is established and that zeolite particles of a desired range of sizes are not carried into said countercurrent flow; and

removing said zeolite particles of a desired range of sizes from said lower portion of said secondary separation column.

4. The process of claim 1 wherein the zeolite phase of said zeolite ore is substantially clinoptilolite.

5. The process of claim 2 wherein the zeolite phase of said zeolite ore is substantially clinoptilolite.

6. The process of claim 3 wherein the zeolite phase of said zeolite ore is substantially clinoptilolite.

7. The process of claim 1 wherein the zeolite phase of said zeolite ore comprises one or more of the group consisting of clinoptilolite, mordenite, or other naturally occurring zeolite minerals.

8. The process of claim 2 wherein the zeolite phase of said zeolite ore comprises one or more of the group consisting of clinoptilolite, mordenite, or other naturally occurring

zeolite minerals.

9. The process of claim 3 wherein the zeolite phase of said zeolite ore comprises one or more of the group consisting of clinoptilolite, mordenite, or other naturally occurring zeolite minerals.

10. A method for separation of mineral phases from a natural mineral ore composition, said mineral phases having inherent variations in hydration properties, and resulting in differential suspension in a aqueous slurry or suspension, comprising the steps of:

crushing, grinding, or milling said natural ore to substantially liberate said mineral phases;

preparing an aqueous slurry or suspension in demineralized water wherein the low electrolyte content sustains a maximum electrical double layer to aid dispersal and separation of said mineral phases according to extent of hydration; and

separating said mineral phases by integrating the effect of differential suspension and physical separation principles.

11. A method for classification of a particulate compound, said compound including particles possessing an electrical double layer when hydrated in low electrolyte medium and having a range of particle sizes, comprising the steps of:

preparing an aqueous slurry of said particulate compound;

introducing said slurry into a countercurrent classifying

column, said classifying column having one or more stages, a feed injection port at about the midpoint of said classifying column, a demineralized water injection port below said feed injection port, a cap at such column's topmost edge, and an overflow port below said cap;

separating said particulate compound using the separation effect of said electrical double layer; and

extracting an overflow stream through said overflow port.

12. The method of claim 11 wherein said particulate compound is said zeolite particles of a desired range of sizes from said lower portion of said secondary separation column.

The specification filed herewith replaced the above Claims 1-12 and inserted the following new Claims 1-93 in their place:

1. A method for the extraction and purification of zeolite from a zeolite ore containing other mineral phases comprising:

preparing a slurry comprising low electrolyte demineralized water and mechanically preprocessed zeolite ore having a mean particle size ranging from about 10 to 40 microns, said slurry having a density of about 5% to 40%, and said slurry having a low electrolyte demineralized water to mechanically preprocessed zeolite ore mass ratio sufficient to substantially suspend any clay fraction of said zeolite ore;

subjecting said slurry to mechanical dispersion;